

## REMARKS

In the April 7, 2004 Office Action, the Examiner noted that claims 4, 5, 11-13, 15 and 16 were pending in the application and were rejected under 35 U.S.C. § 103. In rejecting the claims, U.S. Patent Application Publications 2001/0050802 to Namiki et al. and 2002/0075560 to Foursa and U.S. Patents 6,433,921 to Wu et al. (References A, C and B, respectively, in the November 22, 2002 Office Action); 6,052,219 to Kidorf et al. (Reference A in the June 6, 2003 Office Action); and 5,241,414 to Giles et al. (Reference A in the April 7, 2004 Office Action) were cited. Claim 16 has been cancelled and claim 17 has been added and thus, claims 4, 5, 11-13, 15 and 17 remain in the case. The Examiner's rejections are traversed below.

### Newly Cited Prior Art: U.S. Patent 5,241,414 to Giles et al.

The Giles et al. patent is directed to a fault tolerant optical amplifier arrangement in which an  $M \times N$  star coupler 13 (Fig. 1) combines the output from  $M$  pump lasers  $11_1 \dots 11_M$  to amplify signals in  $N$  transmission lines.

### Rejections under 35 U.S.C. § 103

In item 1 on pages 2-4 of the Office Action, claims 4, 5 and 13 were rejected under 35 USC § 103(a) as unpatentable over Namiki et al. in view of Kidorf et al. and further in view of Giles et al. As discussed in the Amendment filed December 31, 2003, claims 4, 5 and 13 recite an optical transmission system that is able to "avoid degradation of the optical signal/noise ratio by increasing pump amplification before and after a failed pump light source while keeping the transmission in both directions well balanced" (December 31, 2003 Amendment, page 6, lines 20-22). The addition of Giles et al. only addresses the failure of the previously cited prior art to disclose "an optical device to multiplex a plurality of pump lights to produce multiplexed light and to guide the multiplexed light to both the first and second optical transmission lines" (e.g., claim 4, lines 5-8). Nothing has been cited or found in any of the prior art references used to reject the claims teaching or suggesting

that when power of a first pump light, having a first wavelength ... drops to at most a predetermined level in a first Raman amplifier ..., power of a second pump light having a second wavelength substantially equal to the first wavelength is raised in both a second Raman amplifier located next to the first Raman amplifier on a first side and a third Raman amplifier located next to the first Raman amplifier on a second side

(claim 4, lines 8-13).

An illustration of how this problem is addressed by the present invention is provided in Exhibit A attached hereto. In the example illustrated in Exhibit A, there is a problem in transmission line A associated with the first set of amplifiers in the center of the drawing. As recited in claim 4, the power is increased in the second and third sets of amplifiers on either side of the first set of amplifiers to maintain balanced transmission in both the up-stream line and down-stream line. As discussed in the December 31, 2003 Amendment, neither Namiki et al., nor Kidorf et al. contain any suggestions regarding how to respond to malfunctions in a bi-directional transmission line of Raman amplifiers. The addition of Giles et al. does nothing to overcome the deficiencies of Namiki et al. and Kidorf et al. regarding how to respond to malfunctions. Due to the lack of teaching on this subject, one of ordinary skill in the art would have to engage in undue experimentation to determine that the response recited in the indented quotation above provides the benefit of balanced transmission in both directions after a problem has occurred.

Claims 5 and 13 recite limitations similar to those discussed above with respect to claim 4. Therefore, it is submitted that claims 4, 5 and 13, as well as claims 11-13 and 17 which depend from claim 4, patentably distinguish over Namiki et al. in view of Kidorf et al. and Giles et al.

In item 2 on pages 4-5 of the Office Action, claims 11 and 12 were rejected under 35 U.S.C. § 103(a) as unpatentable over Namiki et al. in view of Kidorf et al. and further in view of Foursa. Contrary to the statement in the first paragraph of this rejection, Namiki et al. in view of Kidorf et al. is not the combination of references used to reject claim 4, since Giles et al. was not included. Therefore, claims 11 and 12 patentably distinguish over the combination of Namiki et al. in view of Kidorf et al. and Foursa for all of the reasons discussed in the December 31, 2003 Amendment, including the reasons discussed above.

It is submitted that Foursa, like the three prior art references discussed above, fails to teach or suggest anything regarding response to a malfunction in a bi-directional transmission line using Raman amplifiers. Therefore, even if Giles et al. is included in the combination of references used to reject claims 11 and 12, it is submitted that claims 11 and 12 patentably distinguish over the prior art for the reasons discussed above with respect to claim 4.

In item 3 on pages 5-7 of the Office Action, claims 15 and 16 were rejected under 35 U.S.C. § 103(a) as unpatentable over Namiki et al. in view of Kidorf et al., Wu et al. and Giles et al. Although the language used is different, claim 15 recites limitations that provide the same benefit as discussed above with respect to claim 4. Claim 15 recites "raising power of a second

pump light having a second wavelength substantially equal to the first wavelength, from the first terminal station to at least one of the Raman amplifiers on each side of the first Raman amplifier" (claim 15, lines 9-11). Thus, it is submitted that claim 15 patentably distinguishes over the prior art for the reasons discussed above with respect to claim 4.

### New Claim 17

Claim 17 has been added to recite details of the invention illustrated in Fig. 13 of the application. As noted above, claim 17 depends from claim 14 and therefore, it is submitted that claim 17 patentably distinguishes over the prior art for the reasons discussed above with respect to claim 4. Furthermore, claim 17 recites details of the invention that are not taught or suggested by the prior art. Therefore, it is submitted that claim 17 further patentably distinguishes over the prior art due to the additional limitations recited therein.

### Summary

It is submitted that the references cited in the Office Action, taken individually or in combination, do not teach or suggest the features of the present claimed invention. Thus, it is submitted that claims 4, 5, 11-13, 15 and 17 are in a condition suitable for allowance.

Reconsideration of the claims and an early Notice of Allowance are earnestly solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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